# Carolina Skies

**National Weather Service, Wilmington, NC** **Winter 2004**


# 2003 Weather

## Technical Problems with Frying Pan Buoy

The National Data Buoy Center is aware of a wave height problem with the new Frying Pan Shoals Buoy. As of January there has been no timetable set to repair the buoy. Over the last few months the buoy had reported the significant wave height sporadically, then eventually during December the wave reports ceased altogether. Fortunately, the old wave sensor on the Frying Pan Shoals Light Tower is still operational and wave data can be found on the website at:

**http://www.ndbc.noaa.gov/station_page.phtml?station=fpsn7**

Once the buoy has been repaired very detailed wave information can be viewed at the following web address:

**http://www.ndbc.noaa.gov/station_page.phtml?station=41013**

If you have any questions, please feel free to contact NWS Wilmington's Marine Program Leader - Steve Pfaff.

## October - December 2003 Climate Summary

Fall 2003 began cool and wet for the Carolina coastal area with near normal conditions experienced for inland regions. October is normally a transition month for the Carolinas as the heat and humidity of summer is finally pushed out by cooler and drier continental air. A series of strong cold fronts accomplished this task on October 14th, 22nd, and 29th. Precipitation for the month totaled 9.58 inches in Wilmington and 8.09 inches in Myrtle Beach, mainly as a result of three days of heavy rainfall as an upper level low stalled along the coast the 8th through the 10th. Radar estimated that eight inches of rain fell in rural northwest Georgetown, SC, flooding a portion of state highway 261.

November 2003 averaged well above normal for temperatures but well below normal in terms of precipitation. A series of dry cold fronts moved through during the month, but the air behind these fronts originated over the Pacific Ocean rather than Canada. After crossing several mountain ranges, these air masses are dry by the time they reach the southeastern United States and often have above normal temperatures. The only significant rain of the month occurred on the 19th and was in the form of heavy showers and thunderstorms. Thunderstorms actually blew trees down in the town of Aynor in Horry County, SC, and a waterspout was sighted off Wrightsville Beach, NC that afternoon.

December 2003 was a very changeable month and averaged several degrees below normal in all areas. Seven significant weather systems affected the Carolinas during the month bringing nearly 10 days with some rainfall recorded. The strongest system actually spawned strong thunderstorms which surprised Wilmington area residents during the evening of the 10th. Precipitation for the month ranged from around an inch above normal around Wilmington to slightly below normal in most other areas.

## Skywarn Recognition Day

Volunteer amateur radio operators (Hams) provide reports on local conditions, and they maintain backup communications support to NWS offices around the nation during hurricanes and other severe weather events. Skywarn Recognition Day was held on December 6, when Hams at NWS offices contacted each other via Amateur Radio during a 24 hour period. At NWS Wilmington we “met” other Hams in Reno NV, the National Hurricane Center in Miami FL, Grand Rapids MI, and others.

# A Case of Stability for Marine Wind

Since the installation of the Frying Pan Shoals Buoy and the resilience of the weather equipment located at the top of the Frying Pan Shoals Light Tower a unique opportunity exists for researching how the wind can be modified in a marine environment. The measurements from these marine stations will be useful when comparing the performance of forecast model. Sea surface temperature, air temperature, and the magnitude of the wind found above the sea surface can significantly impact the wind at the sea surface.

The temperature of the air and ocean directly affect the stability just above the sea surface. Warm air is less dense than cold air thus warm air rises. In most cases there are two scenarios that we see occur over the ocean. If there is cold air overspreading relatively warmer air heated by the ocean then the tendency of the atmosphere is to overturn causing unstable conditions and mixing that leads to stronger winds reaching the sea surface. If there is warm air spreading across relatively colder air cooled by the ocean then there is no tendency to overturn, thus the atmosphere is stable and the stronger wind above the sea surface remains above the sea surface.

Off the Carolina coast an example of an unstable case occurs during the cool season when a cold front pushes cold air over warmer sea water. The ocean heats the air near the sea surface creating instability. This is why the wind usually increases dramatically in the wake of cold fronts. The stable cases usually occur when warm air preceding a cold front overspreads sea water temperatures that are relatively cooler. In this case the ocean water cools the air near the sea surface causing stable conditions preventing the wind above the sea surface from mixing down.

Forecast models generally have a hard time reflecting the stability near the surface of the ocean.
Typically they overestimate the wind during the stable case and underestimate the wind during unstable cases. Marine forecasters have to make adjustments to account for these biases.

# How About Spring?

The National Weather Service Climate Prediction Center issues long-term outlooks for the coming year. On the web, go to your bookmarked NWS Wilmington at http://weather.noaa.gov/ilm and then click on Climate Prediction in the left margin, and see the Climate Prediction Center website. There you can find a broad range of forecast from the status of Pacific Ocean temperatures in El Nino regions to the status of ozone in the Stratosphere...and many other oscillations and indices around the planet.

In the absence of significant El Nino conditions, there are no strong global indicators that would swing the likelihood of below or above normal temperatures or precipitation. Therefore, the forecast, at this point, for Spring 2004 is for equal chances of temperatures and precipitation being above normal, normal, or below normal in our area.

# Groundhog Day 2004

It is important that the partnership in Public Safety against natural hazards continue strong, with awareness of programs, methods and operations being refreshed periodically.

NWS Wilmington hosted a Groundhog Day workshop for State and County Emergency Managers, Coast Guard, Red Cross, TV Meteorologist and others from the media, Amateur Radio operators, and other partners in public safety. We reviewed NWS product and policy changes over the past year. We examined the partnership between public (NWS) and private (TV and others)

meteorologists and how to make it work better. We reviewed hurricane Isabel's impact and our response.

Also, Amateur Radio Skywarn Program leader Rick Tharrington was recognized for 10 years of volunteer service to the NWS.

**Monthly Climate Data**
**Averages & Totals (Departures from Normal)**

| **Wilmington, NC** | **October** | **November** | **December** |
|---|---|---|---|
| Highest Temp | 83 | 84 | 71 |
| Average High | 73.5 (-2.0) | 71.5 (+3.7) | 56.7 (-2.8) |
| Average Temp | 63.6 (-1.2) | 59.8 (+3.3) | 45.0 (-3.9) |
| Average Low | 53.8 (-0.1) | 48.1 (+3.0) | 33.3 (-4.8) |
| Lowest Temp | 41 | 31 | 23 |
| Precipitation | 9.58 (+6.37) | 1.95 (-1.31) | 4.95 (+1.17) |

| **N. Myrtle Beach, SC** | **October** | **November** | **December** |
|---|---|---|---|
| Highest Temp | 81 | 82 | 69 |
| Average High | 73.5 | 70.1 | 55.6 |
| Average Temp | 64.2 (-0.3) | 59.4 (+4.8) | 44.5 (-3.3) |
| Average Low | 54.9 | 48.7 | 33.5 |
| Lowest Temp | 42 | 30 | 24 |
| Precipitation | 8.09 (+4.99) | 1.58 (-1.39) | 2.70 (-0.75) |

| **Florence, SC** | **October** | **November** | **December** |
|---|---|---|---|
| Highest Temp | 84 | 83 | 67 |
| Average High | 74.5 | 71.5 | 54.9 |
| Average Temp | 63.6 (-0.4) | 58.8 (+3.4) | 43.2 (-4.3) |
| Average Low | 52.7 | 46.2 | 31.5 |
| Lowest Temp | 39 | 27 | 21 |
| Precipitation | 2.37 (-0.26) | 1.45 (-1.14) | 2.70 (-0.75) |

| **Lumberton, NC** | **October** | **November** | **December** |
|---|---|---|---|
| Highest Temp | 84 | 85 | 68 |
| Average High | 73.7 | 71.2 | 53.8 |
| Average Temp | 63.1 (+2.1) | 58.5 (+5.7) | 42.5 (-2.2) |
| Average Low | 52.4 | 45.9 | 31.2 |
| Lowest Temp | 38 | 29 | 21 |
| Precipitation | 5.14 (+1.78) | 1.38 (-1.31) | 3.07 (-0.15) |